

GraDS MacroGrid

Carl Kesselman

USC/Information Sciences
Institute

MacroGrid Goals

- Runtime environment for Grads Experiments
- Infrastructure services for higher-level GraDS function
- Clearinghouse for user-oriented resource information
- Side effect:
 - ◆ Develop technology and tools to support specialized Grid communities

Previous Testbed Experiences

- GUSTO, National Technology Grid
 - ◆ Many sites, no attempt to specialize, no software resources.
 - ◆ Scalability issues highlighted (e.g. N^2 network performance data).
- IPG, ASCI
 - ◆ Closed testbeds, smaller scale, stand-alone information services

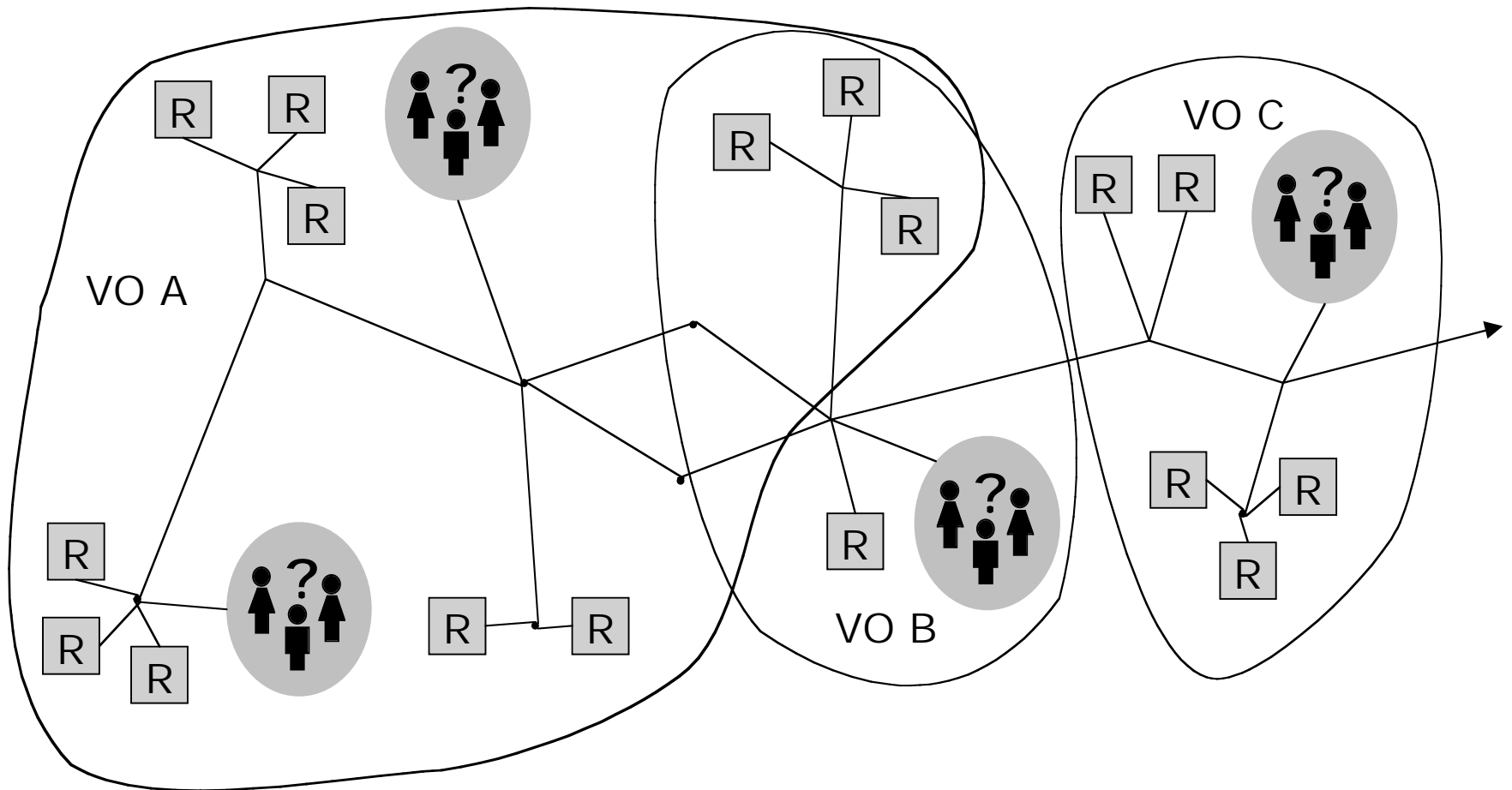
GraDS MacroGrid Approach

- Customized information space to capture execution space
 - ◆ GraDS testbed as a “virtual organization”
- Web based tools to disseminate information
 - ◆ Oriented towards users and administrators
- Additional services to support software distribution and other group activities

What is a Virtual Organization?

- Facilitates the workflow of a group of users across multiple domains who share [some of] their resources to solve particular classes of problems
- Collates and presents information about these resources in a uniform view

Virtual Organization Structure



Characteristics of VOs

- Shared resources (hardware, software, tools)
 - Geographically dispersed
 - Across administrative domains
 - Differing policies for access
 - Heterogeneous
- Common tasks and goals
- Community of users
- POC, web pages, mailing lists etc

Requirements for Creating a VO

- Unified view of collated hardware resources
- View of software on each resource
 - (software, versions, patches, include libraries)
- Local environment info
 - policies, installation locations
- Resource availability within the nodes

Use Information Services as basis for creating and organizing virtual organizations.

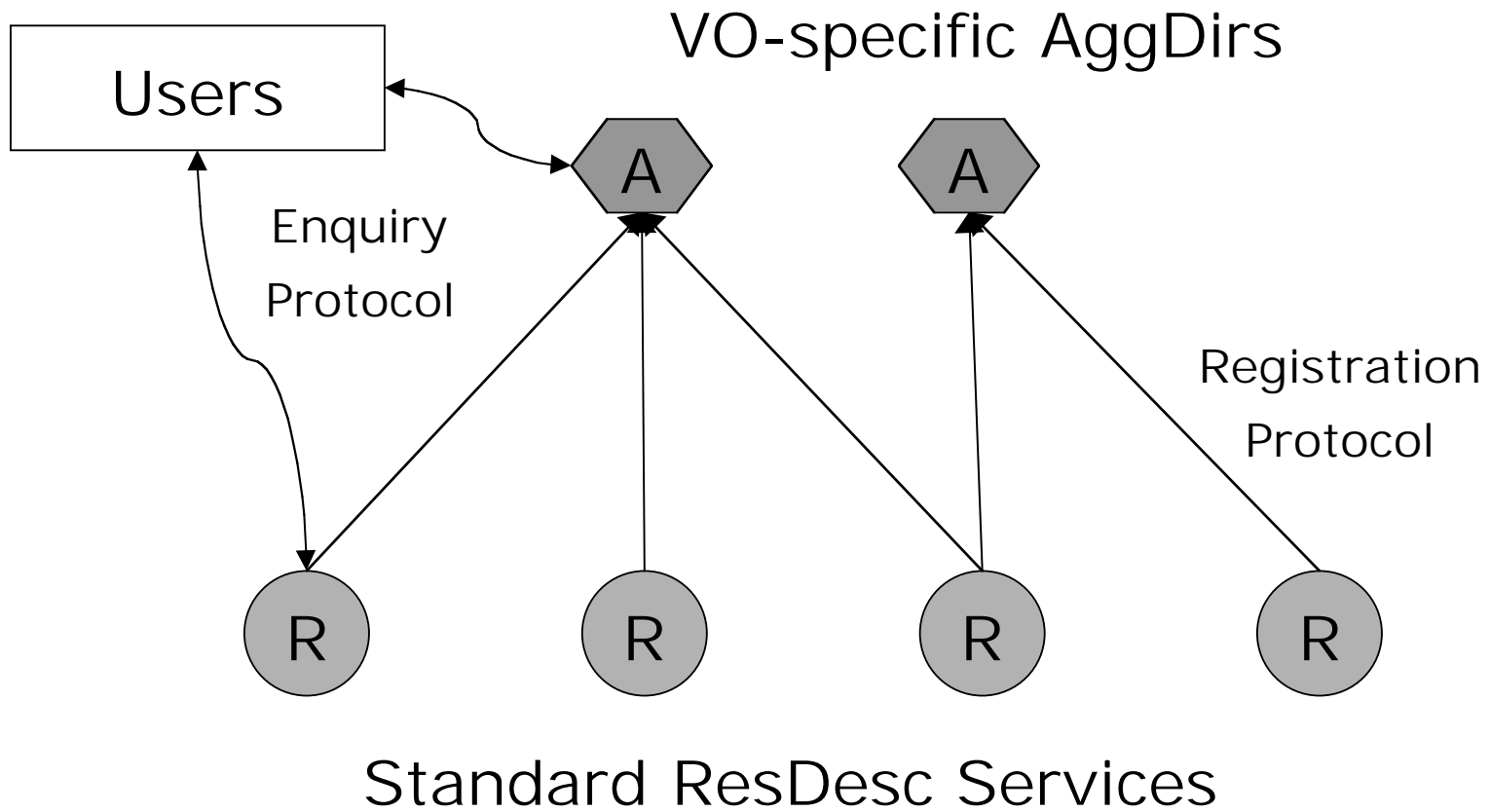
Two Classes Of Information Servers

- Resource Description Services (ResDesc)
 - ◆ Supplies information about a specific resource (e.g. Globus 1.1.3 GRIS).
- Aggregate Directory Services (AggDir)
 - ◆ Supplies collection of information which was gathered from multiple GRIS servers (e.g. Globus 1.1.3 GIIS).

Information Protocols

- Grid Resource Registration Protocol
 - ◆ Support information/resource discovery
 - ◆ Designed to support machine/network failure
- Grid Resource Inquiry Protocol
 - ◆ Query resource description server for information
 - ◆ Query aggregate server for information
 - ◆ LDAP V3.0 in Globus 1.1.3

VO Architecture



GrADs VO Services

- Testbed status
- Software information
- Administrative Information
- Resource Availability
- Two VO servers set up:
 - USC/ISI
 - UIUC

VO Server

- Server at ISI and U. Illinois
 - ◆ Multiple registrations per GRIS
- Information cached in VO server
 - ◆ TTL associated with each piece of information
 - ◆ Access time bounded by slowest GRIS
 - Problems with GRIS timeout discovered and fixed
 - Faulty nodes discovered
- Simplified configuration in next version of server

GraDS Testbed Status

- Enumerate resources available on testbed
 - ◆ Based on service registration protocol
- Available via Web page and programmatically via LDAP protocol
- Limitations in current approach
 - ◆ Don't have notion of GraDS compliant systems
 - Filtering based on basic software and functionality
 - ◆ Don't distinguish between systems that are down and systems that are in the testbed

System Status

GrADS Testbed Home

Administrator Services

- [Software Packages](#)
- [Publishing Software information](#)
- [Master Mapfile](#)
- [Accounts Setup](#)
- [Information Services](#)
- [NWS](#)
- [RIE](#)

The GrADS Testbed

- [Status \(from ISI\)](#)
- [Status \(from UIUC\)](#)
- [Status \(ISI, alternate\)](#)
- [GrADS GIS Browser](#)

User Services

- [Getting Accounts](#)
- [Getting Support](#)

Testbed Mailing lists

- [help via e-mail](#)

Related Sites

- [GrADS Main Page](#)
- [Docs, People](#)

GrADS
Grid Application Development Software Project

Testbed Status (from ISI) as of Sun Apr 29 12:18:08 PDT 2001.

Host	Port	Age	TTL	Software {Name, Version}
amajor.cs.uiuc.edu	2135	103 s	1200 s	{ MPICH-G, 1.1.2 UIUC_patch } { Globus, 1.1.3 } { Autopilot, 2.3.0 } { NWS, 2.0.b7 } { ScaLAPACK, 1.6. } { PAPI, 1.1.5 } { HDF5, 1.4.0 } { MPICH-G, 1.1.2 UIUC_patch } { Globus, 1.1.3 } { Autopilot, 2.3.0 } { NWS, 2.0.b7 } { ScaLAPACK, 1.6. } { PAPI, 1.1.5 } { HDF5, 1.4.0 } { MPICH-G, 1.1.2 UIUC_patch } { Globus, 1.1.3 } { Autopilot, 2.3.0 } { NWS, 2.0.b7 } { ScaLAPACK, 1.6. } { PAPI, 1.1.5 } { HDF5, 1.4.0 } { MPICH-G, 1.1.2 UIUC_patch } { Globus, 1.1.3 } { Autopilot, 2.3.0 } { NWS, 2.0.b7 } { ScaLAPACK, 1.6. } { PAPI, 1.1.5 } { HDF5, 1.4.0 }
bmajor.cs.uiuc.edu	2135	106 s	1200 s	{ MPICH-G, 1.1.2 UIUC_patch } { Globus, 1.1.3 } { Autopilot, 2.3.0 } { NWS, 2.0.b7 } { ScaLAPACK, 1.6. } { PAPI, 1.1.5 } { HDF5, 1.4.0 }
caledonia.cs.indiana.edu	2135	561 s	1200 s	{ GLOBUS, 1.1.4 } { MPICH-G, 1.1.2 } { BLACS, 1.1.0 } { SCALAPACK, 1.6.0 }
cmajor.cs.uiuc.edu	2135	5 s	1200	{ MPICH-G, 1.1.2 UIUC_patch }

Software Information

- A customized software object for GrADS
- Provided by GRIS and accessed via Web page and LDAP protocol
- Limited tools provided:
 - ◆ Template that is filled in manually
- Limitations of current approach
 - ◆ These must be automatically generated
 - ◆ Not used by runtime tools. This is partly a communication issue

Software Status Page

The screenshot shows a Microsoft Internet Explorer browser window titled "The GrADS TestBed Plan - Microsoft Internet Explorer". The address bar shows "http://www.isi.edu/grads/". The page content is organized into a sidebar and a main content area.

GrADS Testbed Home

Administrator Services

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- [GrADS GIS Browser](#)

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- [Getting Accounts](#)
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Testbed Mailing lists

- [help via e-mail](#)

Related Sites

- [GrADS Main Page](#)
- [Docs People](#)

GrADS
Grid Application Development Software Project

dn	<i>swd=HDF5, hn=amajor.cs.uiuc.edu, dc=cs, dc=uiuc, dc=edu, o=Grid</i>
objectClass	GrADSSoftware
name	HDF5
releasemajor	1
releaseminor	4
releasepatch	0
swd	HDF5
hn	amajor.cs.uiuc.edu
installationdirectory	/usr/local/encap/hdf
lastupdate	Tue Mar 13 17:20:51 CST 2001
objectname	<i>swd=HDF5, hn=amajor.cs.uiuc.edu, dc=cs, dc=uiuc, dc=edu, o=Grid</i>

- [o=Grid](#)
 - o [dc=edu](#)
 - [dc=uiuc](#)
 - [dc=cs](#)

11% 12:21 PM

Resource Availability

- Information published through GRIS
 - ◆ Load averages
 - ◆ System configuration (CPU type, OS, etc)
 - ◆ Links to registered software
 - ◆ NWS information
 - Partially integrated
- Easily extensible to incorporate other information

Resource Status Information

The screenshot shows a Microsoft Internet Explorer browser window titled "The GrADS TestBed Plan - Microsoft Internet Explorer". The address bar shows "http://www.isi.edu/grads/". The page content is organized into several sections:

- Navigation:** Links for Status (from ISI), Status (from UIUC), Status (ISI, alternate), and GrADS GIS Browser.
- User Services:** Links for Getting Accounts and Getting Support.
- Testbed Mailing lists:** Link for help via e-mail.
- Related Sites:** Links for GrADS Main Page, Docs, People, AppLeS in GrADS, appleseeds AppLeS Utilities, xdlutester UTK, Cactus Installation Chicago, and HDF5 Installation.
- Corrections or Suggestions:** Link for <mailto:shelley@isi.edu>.
- Metadata:** Updated: March 5, 2001 by Shelley Henderson; Created: August 03, 2000 by Sridhar Gullapalli.
- Hardware Specification Table:**

hn	opus0.cs.uiuc.edu
objectname	hn=opus0.cs.uiuc.edu, dc=cs, dc=uiuc, dc=edu, o=Grid
ttl	undefined
resourcename	Host opus0.cs.uiuc.edu
hostname	opus0.cs.uiuc.edu
canonicalsystemname	i686 unknown linux 2.2.17-14smp
manufacturer	unknown
model	Pentium II (Deschutes)
machinehardwarename	i686
hostid	ae8014ec
type	workstation
osname	linux
osversion	i686 unknown linux 2.2.17-14smp
osrelease	2.2.17-14smp
ostype	linux
physicalmemorysize	251 MBytes
cpustype	GenuineIntel Pentium II (Deschutes) 6 (step 2) (fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 mmx fxsr)
fputype	GenuineIntel Pentium II (Deschutes) 6 (step 2) (fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 mmx fxsr) (fdiv_bug no)
cpucount	1
cpuspeed	448 MHz
cpuload1	1.17
cpuload5	0.25
cpuload15	0.08

The browser's status bar shows "Done" and "Internet". The taskbar at the bottom includes the Start button, several application icons, and the system tray showing "The GrADS TestBed PL...", "Microsoft PowerPoint - [Si...", "51%", and "1:45 PM".

Administrative Information

- Standard account pool and common map file
- No tools to support mapfile dissemination
 - ◆ Probably adequate for current GraDS testbed

Project Milestones

- Year one:
 - ◆ "...define....interfaces that enable information sharing across Grid compilers, runtime systems, and libraries."
- Year two:
 - ◆ "... create early prototypes of... runtime and testbed components, ..."

MacroGrid Summary

- Testbed operational for nine months
 - ◆ Used for two application experiments to date
- Starting second iteration of testbed technology
 - ◆ Performance tuning, feature enhancement
 - ◆ Extend scope